



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,830	03/24/2004	Brian Taggart	ITL.1119US (P18791)	4317
21906	7590	04/18/2005	EXAMINER	
TROP PRUNER & HU, PC 8554 KATY FREEWAY SUITE 100 HOUSTON, TX 77024			LEE, CALVIN	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	Application No. 10/807,830	Applicant(s) TAGGART et al.	
	Examiner Lee, Calvin	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on March 15, 2005 (Remark).  
 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-9, 11-18 and 20-28 is/are rejected.  
 7) ☒ Claim(s) 10, 19 and 29 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 15 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____  |

## OFFICE ACTION

### *Response to Amendment*

1. The amended of Figure 1, received on March 15, 2005, is acknowledged.

### *Claim Rejections - 35 U.S.C. § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the U.S.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1, 3-6, 9-16, 18-22, and 24-29 are rejected under 35 U.S.C. 102(e) as anticipated by *Babb et al* (US 6,569,508).

*Babb et al* discloses a method of forming a flexible package having a flexible substrate:  
-forming a cavity 58 in at least two buildup layers 54, 56 over a flexible substrate 70 [Fig. 7]  
within which a semiconductor die 68 sits [col. 5, ln.59]

-forming an interconnection layer 42 between the buildup layers [Fig. 1 and 5]

4. Claims 1-29 are rejected under 35 U.S.C. 102(e) as anticipated by *Eslamy* (US 6,784,536).

Since *Eslamy* discloses a polyimide substrate [col. 1, ln.25], *Eslamy* inherently teaches or suggests a flexible package having a flexible substrate. Its formation method comprises of:

-forming a cavity 38 in at least two buildup layers over the flexible substrate 32 [see col. 3, ln.2, "a multi-layer organic substrate"] within which a semiconductor die 40 sits [col. 3, ln.10]

-forming a wiring 42 from the package to the die and solder balls 70 coupled thereto [Figs. 1-2]

### *Claim Rejections - 35 U.S.C. § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 11-12, 16, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kinsman* (US 6,172,419) in view of *Eslamy*.

*Kinsman* discloses a low profile ball grid array flexible package, and its method comprising:

- forming a cavity 114 in a package having a substrate 102 and a polyimide thin layer 116, wherein a semiconductor die 120 is secured within the cavity [Fig. 2]

- forming a wiring 124 from the package to the die and solder balls 128 coupled thereto [Figs. 2-3]

*Kinsman* suggests, “substrate 102 ... formed from an organic epoxy-glass resin material, such as BT resin or FR-4 board” [col. 4, ln.35] but is silent about a flexible substrate not a flexible package. Nevertheless, such flexible substrate is known in the semiconductor packaging art as evidenced by *Eslamy* disclosing “the organic substrate may be ... BT, FR4, polyimide, and polytetrafluoroethylene” [col. 1, ln.25]. *Eslamy*’s polyimide substrate is therefore a flexible substrate

It would have been obvious to one of ordinary skill in the art to have modified the organic substrate of *Kinsman* by utilizing a polyimide substrate for the purpose of preventing a chip carrier warping due to temperature changing of subsequent curing or treatment steps.

7. Claims 2, 7-8, 17, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Babb et al*, as applied to claims 1, 11, and 20, in view of *Kinsman*.

*Babb et al* is silent about lands coupled to solder balls and wire bonds. *Kinsman* discloses lands 39 coupled to solder balls 40 and wire bonds 49 [Fig. 1b].

It would have been obvious to one of ordinary skill in the art to have modified the package of *Babb et al* by utilizing lands coupled to solder balls and wire bonds for the purpose of having a better electrical interconnect between interconnection layers and the package die.

*Allowable Subject Matter*

6. Claims 10, 19, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited arts teaches or suggests a folded package.

*Response to Arguments*

7. Applicant's argument that "*Kinsman* teaches a BT ... rigid substrate" is persuasive. However, *Kinsman* inherently teaches or suggests a flexible package because *Kinsman* discloses a thin sheet 116 of polyimide supporting a resin substrate 102 [col. 4, ln.51]. Therefore, the argument that "there is no flexible package shown in the structure of *Kinsman*" is unpersuasive.

The applicant argued, "all *Eslamy* teaches is an organic substrate. It is not indicated whether the substrate is a flex or a rigid substrate." The examiner notes that *Eslamy* teaches or suggests a flexible substrate (see *Eslamy*, col. 1, ln.25, "the organic substrate may be ... BT, FR4, polyimide and polytetrafluoroethylene").

Applicant's argument that "*Manteghi* does not teach a cavity in a flexible package" is persuasive. However, US 6,569,508 to *Babb et al* reads on features of the invention.


In conclusion, applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new grounds of rejection.

Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 on Mondays thru Thursdays 6:30-4:30PM. If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2818's Supervisory Patent Examiner *David Nelms* can be reached at (571) 272-1787. The fax phone number for the organization (where this application is assigned to) is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system at <http://pair-direct.uspto.gov>. Should you have questions on access to the PAIR system, contact the Electronic Business Center at (866) 217-9197.

*CL*

Date: April 14, 2005

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800